



**2nd Annual NASA/JPL
Small Business Symposium
and Awards Ceremony**

***Small Businesses Building a
High Tech Industrial Base for the Future***

***David P. Radzanowski
Deputy Associate Administrator
Program Integration
Office of Space Operations***

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About Space Operations

- The **Space Operations Mission Directorate (SOMD)** directs spaceflight operations, such as space launches and integrated systems in low Earth orbit and beyond, including the International Space Station. SOMD enables other Agency missions by acquiring launch services, providing space communications and navigation services, and testing rocket engines. The International Space Station serves as a foundation for human lunar outposts and human missions to Mars by providing vital scientific and engineering information that will lead to more capable and safer future systems for human explorers.

We enable NASA missions

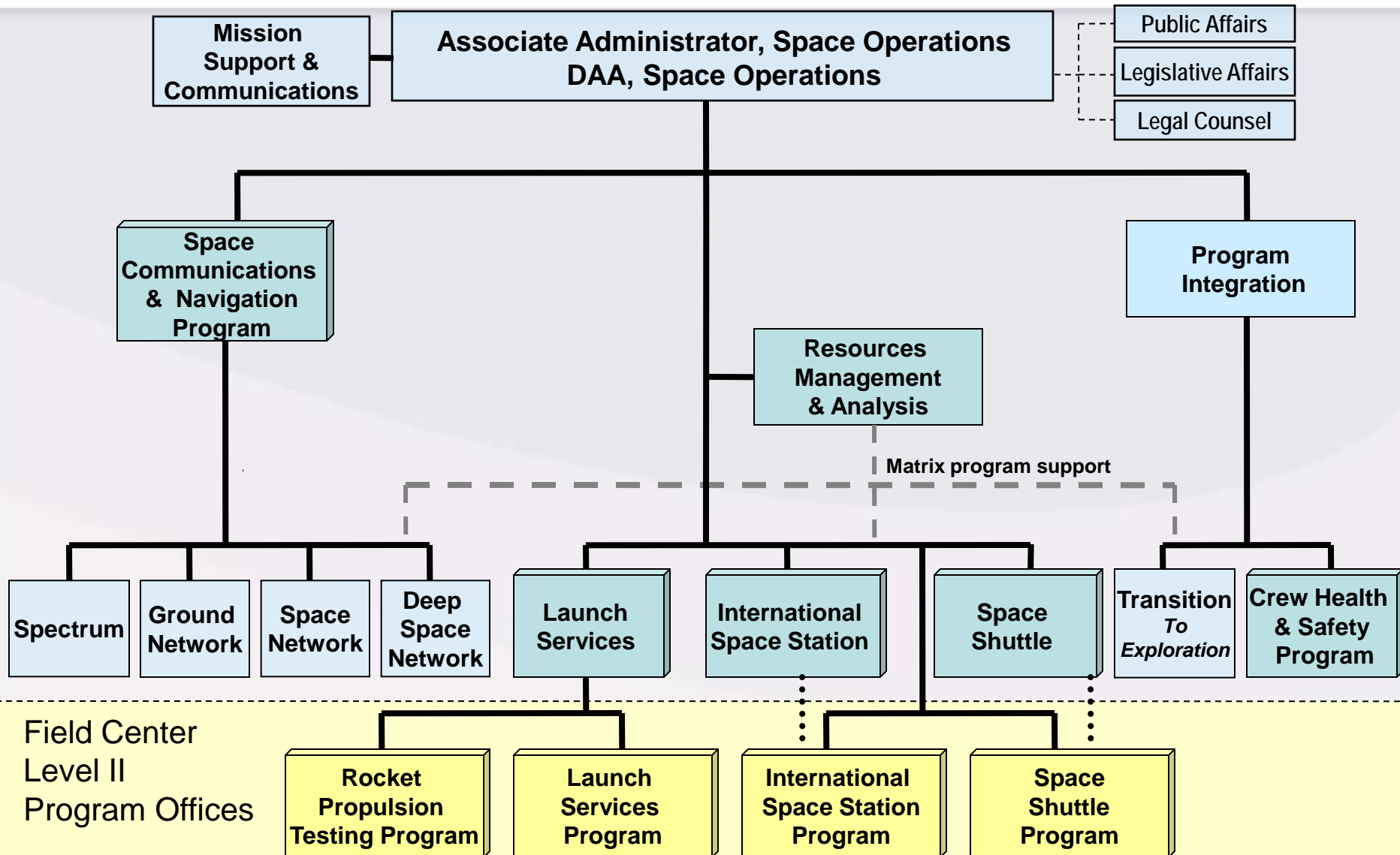


Key Challenges

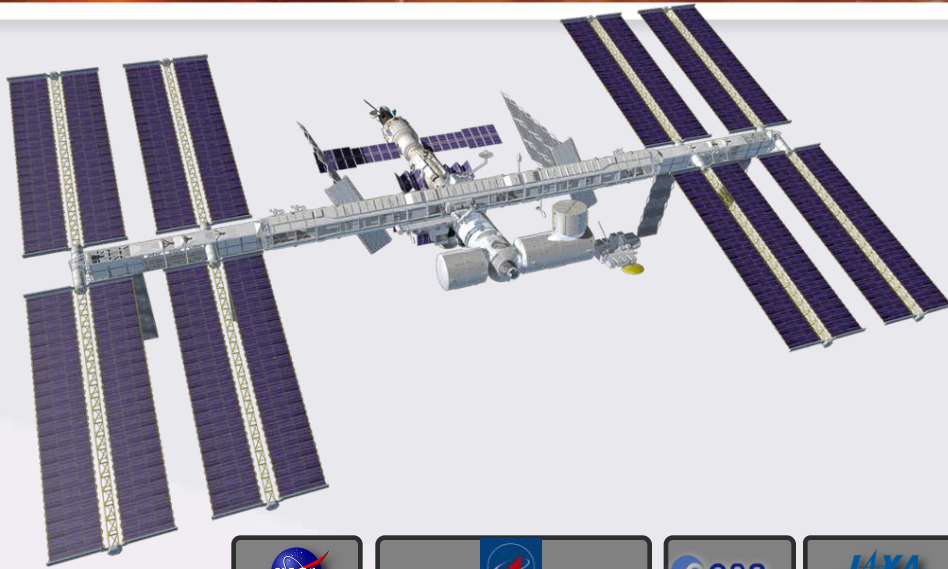
- Completing assembly of the International Space Station
- Utilizing, operating and sustaining the International Space Station
- Acquiring commercial space launches; mixed fleet and emerging players
- Pursuing an integrated space communications architecture
- Transitioning from Shuttle to future space transportation systems



SOMD Organization Structure



International Space Station



- International Partnership (ESA/JAXA/CSA since 1988, Roskosmos since 1993)
- Builds on long history of international cooperation
- Largest spacecraft ever built
 - 420,500 kg at completion
 - Over 40 assembly flights
- Continuous human presence for 9 years (since Expedition 1 in Nov 2000)
 - Currently 6 crew
- International crew
- International launch fleet
- Globally distributed operations



Shuttle

Proton Soyuz

Ariane

H-II



International Space Station



- Complete ISS assembly
- Provide logistics to operate and maintain the ISS
- Perform research
- Serve as operations testbed for future Exploration missions
- Operate as a National Lab

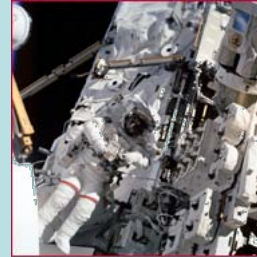


Space Shuttle Overview

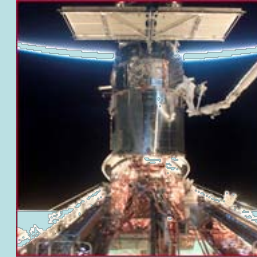
- World's first reusable heavy-lift spacecraft with many unique capabilities
- 100 mission design life for each orbiter - 120 missions to-date

To complete the Shuttle's mission:

- 6 flights to the ISS
- The Space Shuttle will be retired with the completion of the ISS
 - Shuttle retirement is not about going out of business. Rather, it is about transitioning to a new way of doing business.
- Retirement is a combination of transfer and close-out activities. It is big, complex, uncharted, and emotional
 - Shuttle occupies 640 facilities, employees 15,000 people, and has 900,000 line items of associated equipment with total assets valued near \$18B



On-orbit Assembly



Satellite Retrieval and Repair



Point-to-point Maneuvering



Cargo Return



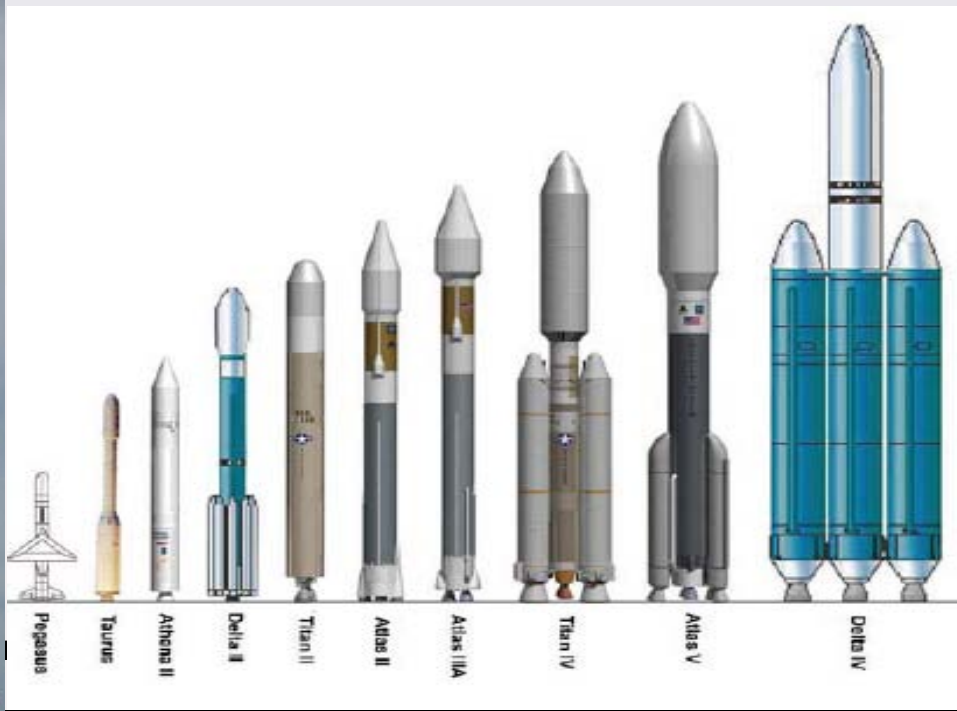
Crew Transfer



The highest Shuttle Program priority is safe and effective mission fly-out

Launch Services Program

- Acquisition of ELV commercial launch services
- Perform mission assurance activities to maximize successful delivery of spacecraft to space
- Mission analysis and integration
- Encouraging emerging launch service providers



Rocket Propulsion Test Program

- Develop & maintain propulsion test facilities at NASA centers “right sized” for current agency mission
- Increase DoD/NASA collaboration
- Increase technical collaboration between RPT centers
 - Cross-training to develop workforce
 - Cross- Utilization of equipment and workforce
 - Common standards and specifications
- Increase understanding of facility maintenance & operations requirements



2009 SOMD SBIR Subtopics

Topic O1 – Space Communications

- O1.01 Coding, Modulation, and Compression
- O1.02 Antenna Technology
- O1.03 Reconfigurable/Reprogrammable Communication Systems
- O1.04 Miniaturized Digital EVA Radio
- O1.05 Transformational Communications Technology
- O1.06 Long Range Optical Telecommunications
- O1.07 Long Range Space RF Telecommunications
- O1.08 Lunar Surface Communication Networks and Orbit Access Links
- O1.09 Software for Space Communications Infrastructure Operations

Topic O2 – Space Transportation

- O2.01 Automated Collection and Transfer of Launch Range Data (Surveillance/Intrusion, Weather)
- O2.02 Ground Test Facility Technologies

Topic O3 – Processing & Operations

- O3.01 Human Interface Systems and Technologies
- O3.02 Vehicle Integration and Ground Processing
- O3.03 Enabling Research for ISS



Topic O4 – Navigation

- O4.01 Metric Tracking of Launch Vehicles
- O4.02 On-orbit PNT (Positioning, Navigation, and Timing) Sensors and Components
- O4.03 Lunar Surface Navigation
- O4.04 Flight Dynamics Technologies and Software
- O4.05 Space-Based Range Technologies

Topic O5 – Low-Cost and Reliable Access to Space (LCRATS) – Cross Cutting Topic for 2009

- A2.01 Materials and Structures for Future Aircraft
- X5.01 Composite Structures - Practical Monitoring and NDE for Composite Structures
- X5.03 Composite Structures - Manufacturing
- X9.01 Ablative Thermal Protection Systems
- X9.02 Advanced Integrated Hypersonic Entry Systems
- O3.02 Vehicle Integration and Ground Processing



Future Projects Acquisition Opportunities

- See ESMD/SOMD Integrated Acquisition Roadmap at www.nasa.gov/Transition
- SOMD is preparing to start the solicitation development for the 2010 SBIR Topics and sub-topics
 - SOMD is looking to significantly reevaluate your current Topics and sub-topics.
 - The purpose is to:
 - more clearly align with future needs and goals of future operations
 - promote and foster innovation and technology development in our currently operational programs
 - Enable current programs to serve as testbeds for future operations and exploration
 - Send us your ideas for sub-topics
 - Where do you think the gaps are for future operations?



Future Projects Partnership Opportunities

- International Space Station – National Laboratory



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Future Projects Partnership Opportunities

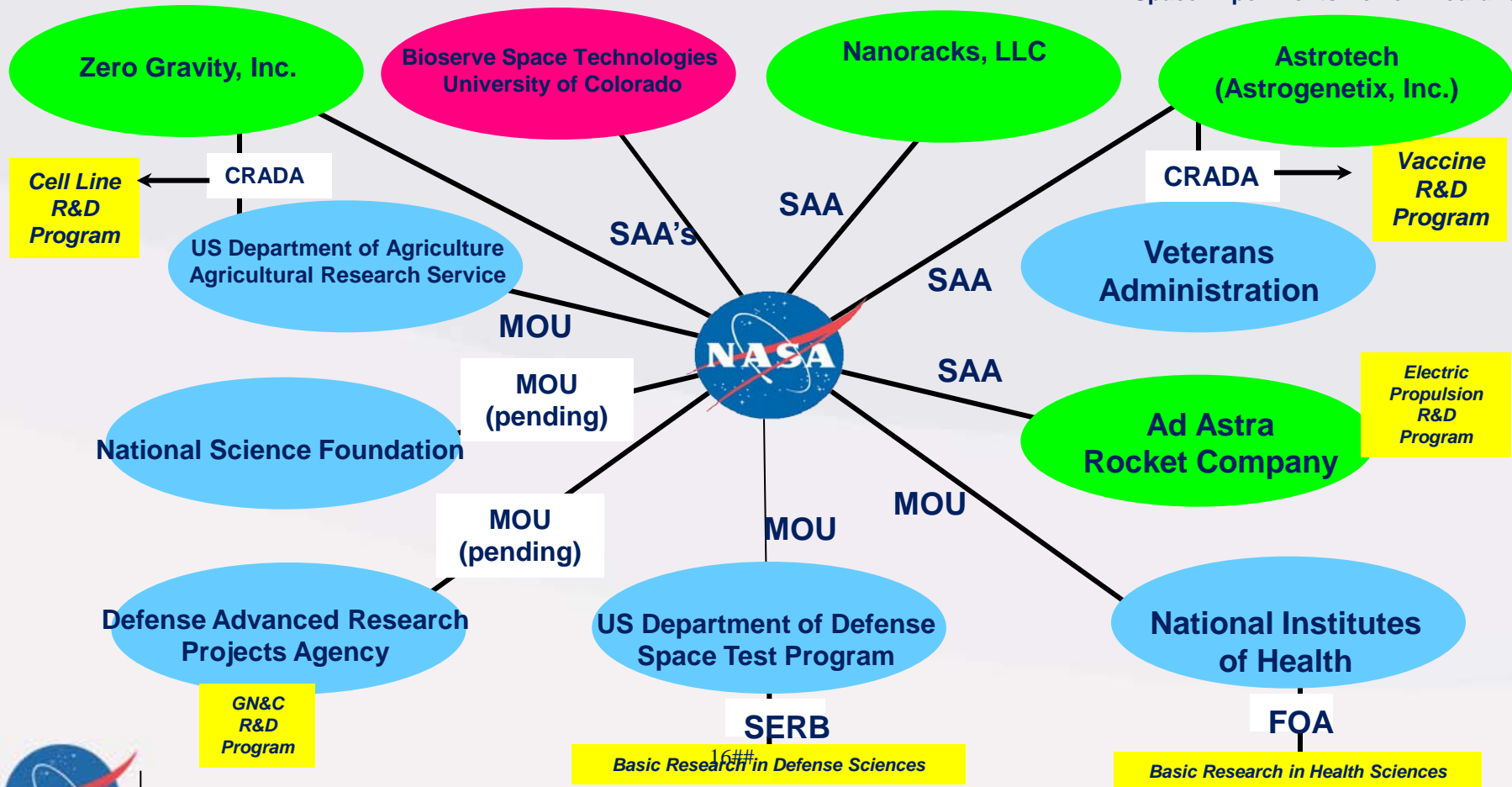
- Why was the International Space Station designated a US National Laboratory?
- Once ISS assembly is complete and 6 crew (already has 6 person crew) are present on board, the ISS payload science capability is not fully utilized by NASA's planned science program
- In order to maximize the return on investment of the ISS, Congress wanted to open up the orbiting laboratory to non-NASA users
- In the December 2005 NASA Authorization Act, Congress designated the ISS as a National Laboratory
 - Opportunity for other government agencies to use ISS to meet their agency objectives
 - Opportunity for commercial interests to use ISS in the interests of economic development in space



Future Projects Partnership Opportunities

Academic Sector
Industrial Sector
Government Sector

Cooperative Research & Development Agreement: CRADA
Funding Opportunity Announcement: FOA
Memorandum of Understanding: MOU
Space Act Agreement: SAA
Space Experiments Review Board: SERB



Future Projects Partnership Opportunities

- National Lab Opportunity available –

OPPORTUNITY FOR THE USE OF THE INTERNATIONAL SPACE STATION BY DOMESTIC ENTITIES OTHER THAN U.S. FEDERAL GOVERNMENT AGENCIES

http://www.nasa.gov/mission_pages/station/science/nlab



- Space Operations Mission Directorate
- POC: Jason Crusan
- Telephone: 202.358.0635
- Fax: 202.358.3530
- Email: jason.c.crusan@nasa.gov
- <http://spaceoperations.nasa.gov/>

